

O I P E
JUL 02 2002
PATENT & TRADEMARK OFFICE

Figure 1

Verfi: 1 to 3640

CGGGGGGATGGGGAGGAGGGGGGTGGCGCGCCGACGCCATGGAGGCCAACTGGACCGGTTCTCTGTTCACGGCCCAAGCATCCCAT 90
M E A N ' W T A F L F Q A R E A S H 17
CACCAACAGCAGGCAGCGCAGAACAGCTTGCTGCGCCCTCTGAGTTCTGCTGTGGAGCCCGCTGTACAGAAACCGTTGCTTCCAAATCA 180
H Q Q Q A A Q N S L L P L L S S A V E P P D Q K P L L F I P
ATTACTCAGAAACCTCAGSCTGCCACAGAAACATTAAAGGATGCCATTGGGATTAAAAAGAAAAACCAAACACTGTGTTGTGTGCACT 270
I T Q K P Q A A P E T L K D A I G I K K E K P K T S F V C T
TACTGCAGTAAAGCATTCAGGAGCAGCTATCAGCTGAGGCGCCATCAGTCTGCCACACAGGGATCAAGTTGGTGTCTCGGGCAAGAAA 360
Y C S K A F R D S Y H L R R H O S C H T G I K L V S R A K K
ACCCCCACCAAGGTGGTTCCTCTATCTCCACCATTTGCTGGGGACAGCAGCGAACTTCGTTGGTTTCAACTATTCAGAGCACTTTGTCA 450
T P T T V V P L I S T I A G D S S R T S L V S T I A G I L S
ACAGTCACTACATCTTCCTGGGACCAACCCAGCAGCAGCGCTAGTACCACAGCAATGCTGTGGCCAGCTGTCTCAAGAAACCCAGT 540
T V T T S S S G T N P F S A S T T A M P V P Q S V K P S
AAGCCTGTCAAGAAAGAACCGCTGTGAGATGTGTGGGAAGGCTTCGGGATGTGTACACCTCAATGGCACAAGCTCTCCCATTCG 630
K P V K K N S A C E M C G K A F R D V Y H L N R H K L S H S
GACGAAAGCCCTTGAGTGTCTTATTTATTCAGCGCTTCAAGAGGAAGGACCGGATGACTTACATGTAGAGTCTCATGAAGAGAGG 720
D E C S K A F R D S Y H L R R H O S C H T G I K L V S R A K K
ATCACCAACCCCTATCTGCACTGTTTGTGGGAAGGCTTCTCAAGGCTGACCACTAAGCTGTCTATGTAAAAACATGTGCTCAACA 810
I T K P Y T C S V C G K G F S R P D H L S C H V K H V H S T
GAAAGACCCCTTCAATGCCAAACGTGCACTGTGCTTTGGCACCAGAGACAGACTACGGACACATGTTGGGCCACAGAGCAAGGTA 900
E R P F K C O A T F A T K D R L R T R H E G K P S
TCATGTAACTCTGTGGGAAGCTCTTGAGTGAGCATATATACCAAGCCACTTAAAGACACATGGCCAGAGCCAAAGTATCACTGTAA 990
S C N I C G K L L S A A Y I T S H L K T H G Q S Q S I N C N
ACGTGCAAAAGGCATCAGCAAAACGTGCACTGAGTGAGGAGACAGCAATCAGAAAGCAGCAGCAGCAGCAGCAACAGCAGCAGCAG 1080
T C K Q G I S E K T S N Q K Q Q Q Q Q Q Q Q Q Q
CAACAACAACAATGTGCAAGCTGGCCAGGAGCAGGCTAGAGACTGAGACTGTGGGAAGAGCTGTCAAAGCAAGAAAGAAAGAA 1170
Q Q Q Q H V T S W P G K Q V E T L R L W E E A V K A R K K E
GCTGCCAAGCTGTGCCAAACCTCCACGCGCTGTACGACACCAAGTACTCTCACTACTCAATCAATATAAGCTCTCTGTGTGTCTGGG 1260
A A N C L T P T P V T L T T P F N I T S V S S S G
ACTATGTCAAACCCAGTCAAGTGCGAGCTGCAATGAGCATGAGAAAGTCCAGTAATGTCTCAAGTGCAATTAACATAACAGCCCTTA 1350
T M S N P V T V A A A M S M R S P V N V S S A V N I T S P L
GCCATGACCTCAGCTTAAACACTCACCACCCAGTCAACCTCCCCACCCCTGTGACCGCCCGCAGTGAATATAGCACACCTGTCAACCT 1440
A M T S P L T L T P V T A P V N I A H P V T I
ACATCTCAATGAACCTGCCACTCTATGACATTAGCTGCCCTCTCAATATAGCAATGAGGCGCTGTAGAAAGTATGCCCTTCTTGCCC 1530
T S P M N L P T P F N T L A A P L N I A M R P V E S M P F L P
CAAGCTTGCCATCGTACCGGCTTGGTAAACAGTATTATAAGTCAAAATGGGTTAAAGTAAATATTTACCAGCAACTTAACTTAGTT 1620
Q A L P T S P F W
GATTAAAGCAAAAGCAGACTATGAATTTGGAGGTTTATATGTTAGTTAATAAGAGTGTAGTAGTCCAAATTTTGTGGGGTTGTC 1710
AAAGTAGGTTATGTGTAACTTATCACTGAGACCTTTAGTTTCTCAGAAACCCCTTTAGCTGACACCATTTGCTTAAACAGGATAGTA 1800
GCTGGCAAGAGCAAGTCCAGAAATTAACCAATCAATAAACCATTCAAAATAAAGCAATATTTGTTTATTTATTTATTTTAAAT 1890
ACAAACAGAACTATTTATGTATAACACTAGCAGAGTTCTTCCCTGTGTAAGAGTGAGCGCTTTTAACTGGAGCTCAAGCCAGAGCT 1980
GAGAGCTAGTGAGCATTTGCTGTGGTTTCTCTGTATGAGTGAAACAGAGGCAATGTCAATAAAATGCAATTTCAAGAGATAATGCAAT 2070
TACCTTTGGGAATATGTTAATTTAGGAGCAATTCCTATGGAAGGTGATACCAAGTATGATGAATTTATCAT 2160
TCTACTTCAACATATATATAGGAGTTGTGACCTGATATTTGGAGATGTAATATTTGCTCAGCATATTAATTCCTGTATGGAAATAGCAT 2250
GTAGTTGACTTTTAAAGAAAGAGAGGCTACCCCACTTACAGATGACAGACCTGTGGGGCTCCGGAGAACTGTTGTAGCATGTTTCT 2340
GTTGCTTCAAGAACCCAGGAAGTGGCCAGGAGGACAGAGCTCTGCTGGAGGCTGAGCCGGGGGTTCCATAGGAGACTGACAGGAGACAT 2430
TTTGCTTACGAGCAATATGCGGAGCTCATGTGGGAATGGAGGAGTTTCAATGCGGCTGCTGAGAGCTGCTGATGCTATCCCTGGGATAGG 2520
AGTGTGGCAGCAGATGTTACTACTGAGCATGTCTACAGACCAAGTGTGAGAGTGTACTGTGGGAGTTTCCGGAGGTTTCACTCTCGGA 2610
GAGCTTTGTGAGAGCTGTATACAGGCTTACTCTACCACTTGTGGAAGGAGGAGGAGGAGGAGGAGGAGGAGGAGGAGGAGGAGGAGG 2700
CTATGCGCGTAGCCCTGGGGTACTTCCCGCAAGGCTCGCTATGCTGTGCGCTGTGTGGAAGAGGACAGTGGGCTCCCTGGGGCTTG 2790
TGAGAGCAGCAATATGCGGAGCTCATGTGGGAATGGAGGAGTTTCAATCGCGCCAGGACACTGCGCTGTGGATGGCAGGGAGATA 2880
CTTGCCAGACAGATGTTGATGAATAGTACAGGAGGAGGAGGAGGAGGAGGAGGAGGAGGAGGAGGAGGAGGAGGAGGAGGAGGAGG 2970
GATGGAGGAGCAAGGCCATCTGCAGATGTGGAGCCCTGCTGCTGCTGCTGCTGCTGCTGCTGCTGCTGCTGCTGCTGCTGCTGCTGCT 3060
TGAGCAGCATGCGGAGAGAGAG 3150
ACAGCGCT 3240
AGTCCCAAGACACCACTTACCCACAGAG 3330
GGGAGATTTGCAAGATTCACACCTTTTCT 3420
TAGAGCAGTATGCAAGATTCCTCTGAGCAGATTCAGGAGGAGGAGGAGGAGGAGGAGGAGGAGGAGGAGGAGGAGGAGGAGGAGGAG 3510
TCTTAGGAGGTTCTTAGGACTTGGGATGGGAGTGGGGTCTGTGTGACTCTTCAGTGGGCTCCCTGTCTAAGTGATAGTGGGGAT 3600
TGTCCTCATCTTGTGATAATAAGCTAGACTTGAIAAAAAA 3645

COPY OF PAPERS
ORIGINAL FILED

Figure 2

Human DB1 DNA and Protein S q n c s:

```

      10      20      30      40      50      60
AGCGGGGGGAGTGGGGAGGAGGGGGTCTGGCCCGCCGAGCCATGGAGGCCAACTGGACCG
                                M E A N W T>

      70      80      90      100     110     120
CGTTCCTGTTCCAGGCCCATGAAGCTTCCCATCACCAACAGCAGGCAGGCACAGAACAGCT
A F L F Q A H E A S H H Q Q Q A A Q N S>

      130     140     150     160     170     180
TGCTGCCCCCTCTGAGCTCTGCCGTGGAGCCCCCTGATCAGAAACCATTGCTTCCAATAC
L L P L L S S A V E P P D Q K P L L P I>

      190     200     210     220     230     240
CAATAACTCAGAAACCTCAGGGTGACAGAAACATTAAAGGATGCCATTGGGATTAAAA
P I T Q K P Q G A P E T L K D A I G I K>

      250     260     270     280     290     300
AAGAAAACCCAAAACCTTCATTTGTGTGCACTTACTGCAGTAAAGCTTTCAGGGACAGCT
K E K P K T S F V C T Y C S K A F R D S>

      310     320     330     340     350     360
ATCACCTGAGGCGCCACGAATCCTGCCACACAGGGATCAAGTTGGTGTCCCGGCCAAAGA
Y H L R R H E S C H T G I K L V S R P K>

      370     380     390     400     410     420
AAACCCCCACCACGGTGGTTCCCTTATCTCTACCATCGCTGGGGACAGCAGCCGAACTT
K T P T T V V P L I S T I A G D S S R T>

      430     440     450     460     470     480
CGTTGGTCTCGACCATTGCAGGCATCTTGTCAACAGTCACTACATCTTCTCGGGCACCA
S L V S T I A G I L S T V T T S S S G T>

      490     500     510     520     530     540
ACCCAGTAGCAGTGCCAGCACACAGCTATGCCAGTGACCCAGTCTGTCAAGAAACCCA
N P S S S A S T T A M P V T Q S V K K P>

      550     560     570     580     590     600
GTAAGCCTGTCAAGAAGAACCATGCTTGTGAGATGTGTGGGAAGGCCTTCCGAGATGTGT
S K P V K K N H A C E M C G K A F R D V>

      610     620     630     640     650     660
ACCATCTCAATCGACACAAGCTCTCCCATTCAGATGAGAAACCTTTGAGTGTCTATT
Y H L N R H K L S H S D E K P F E C P I>

      670     680     690     700     710     720
GTAATCAGCGCTTCAAGAGGAAGGACCGATGACTTACCATGTGAGGTCTCATGAAGGAG
C N Q R F K R K D R M T Y H V R S H E G>

      730     740     750     760     770     780
GCATCACCAAACCCCTATACCTTGCACTGTTTGTGGGAAAGGCTTCTCAAGGCCTGACCACT
G I T K P Y T C S V C G K G F S R P D H>

```

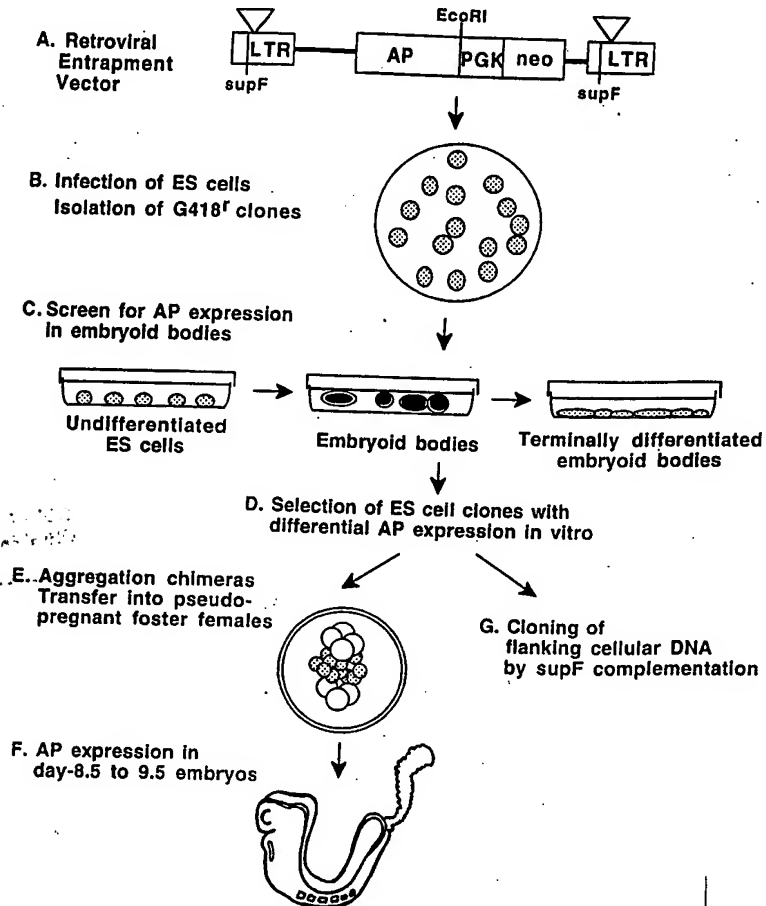
Figure 2 (con't)

790 800 810 820 830 840
 TAAGCTGTTCATGTAAAACATGTCCATTCAACAGAAAGACCCTTCAAATGCCAAACGTGCA
 L S C H V K H V H S T E R P F K C Q T C>
 850 860 870 880 890 900
 CTGCTGCTTTTGCCACCAAAGACAGACTGCGGACACACATGGTGCGCCATGAAGGCAAGG
 T A A F A T K D R L R T H M V R H E G K>
 910 920 930 940 950 960
 TATCATGTAAACATCTGTGGGAAGCTCCTGAGTGCAGCATAACATCACCAGCCACTTAAAGA
 V S C N I C G K L L S A A Y I T S H L K>
 970 980 990 1000 1010 1020
 CTCATGGGCAGAGCCAAAGTATCAACTGTAATACATGTAAACAAGGCATCAGTAAACAT
 T H G Q S Q S I N C N T C K Q G I S K T>
 1030 1040 1050 1060 1070 1080
 GCATGAGTGAAGAGACCAGTAACCAAAAGCAGCAGCAGCAGCAGCAGCAACAACAAC
 C M S E E T S N Q K Q Q Q Q Q Q Q Q Q>
 1090 1100 1110 1120 1130 1140
 AACAAACATGTGACAAGCTGGCCAGGGAAGCAAGTAGAAACACTCAGACTGTGGGAAG
 Q Q Q H V T S W P G K Q V E T L R L W E>
 1150 1160 1170 1180 1190 1200
 AAGCTGTTAAAGCAAGGAAGAAAGAGCTGCTAACCTGTGCCAAACCTCCACGGCTGCTA
 E A V K A R K K E A A N L C Q T S T A A>
 1210 1220 1230 1240 1250 1260
 CGACACCTGTGACTCTCACTACTCCATTTCAGTATAACATCCTCTGTGTCGTCTGAGACTA
 T T A P V T L T T P F S I T S S V S S E T>
 1270 1280 1290 1300 1310 1320
 TGTCAAACCCAGTCACAGTGGCAGCTGCAATGAGCATGAGAAGTCCAGTAAATGTTCAA
 M S N P V T V A A A M S M R S P V N V S>
 1330 1340 1350 1360 1370 1380
 GTGCAGTTAAACATAACCAGCCCAATGAACATAGGGCATCCTGTAACTATAACCAGTCCAT
 S A V N I T S P M N I G H P V T I T S P>
 1390 1400 1410 1420 1430 1440
 TATCCATGACCTCTCCTTTAACTCACTACCCAGTCAACCTCCCCACCCCGTCACTG
 L S M T S P L T L T T P V N L P T P V T>
 1450 1460 1470 1480 1490 1500
 CCCAGTGAATATAGCACACCCTGTCAACATCACATCTCCAATGAATCTACCCACACCTA
 A P V N I A H P V T I T S P M N L P T P>
 1510 1520 1530 1540 1550 1560
 TGACATTAGCCGCCCTCTCAATATAGCAATGAGACCTGTAGAGAGCATGCCTTTCTTGC
 M T L A A P L N I A M R P V E S M P F L>

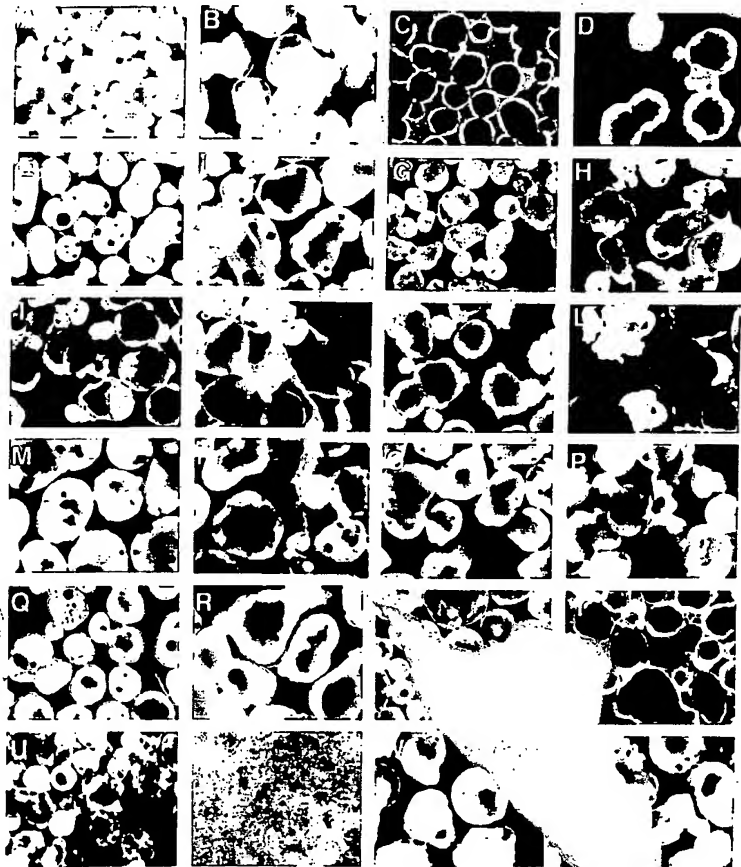
Figure 2 (con't)

1570 1580 1590 1600 1610 1620
 CCCAAGCTTTGCCTACATCACCGCCTTGGTAAACAGTATTATAAAATCAAAATATGGGTA
 P Q A L P T S P P W *>
 1630 1640 1650 1660 1670 1680
 AAAGTAAATATTTACCAGCAACTTAACTTTTAGTTGATTAAAGCAAAAAGTAAACCATGA
 1690 1700 1710 1720 1730 1740
 AATTGGGAGATTTTATTACATTAGTTAATAAGAGTGTGGTAGCATTTTTCTCCAATTTGG
 1750 1760 1770 1780 1790 1800
 CTGGGATTATTCAAAGTAGGGTGTGTATGTAACCTATCACTGGACCACCTTTAGTTTAATC
 1810 1820 1830 1840 1850 1860
 AGAAATTCCTTTTAGCTGACAACATTGCTTAAACAGGATAGTAGTTGGCAAGATGAAATG
 1870 1880 1890 1900 1910 1920
 CCAGAATTAACCAATCATAAGTAGAACCCACTTCAAAATAAAAAACAGCATTACTAT
 1930 1940 1950 1960 1970 1980
 TTCTAATCCCAAGGAATCACTTTATTGTAAACACTAGCAGAACTCTTCTCCCTATACAAG
 1990 2000 2010 2020 2030 2040
 GTGGATGGCTGATTTTAACCTGAAATTTTAAATCCACAGATTGAGAGCTAGTGTAGAATT
 2050 2060 2070 2080 2090 2100
 GTCTGTGTTTATTGTTTTTATGAGTAAATACATGCATTGTCATAATAAAATGCATTTCAG
 2110 2120 2130 2140 2150 2160
 AGAATATGCATTTTACCTTTGGGAATATGTTAATTTAGGCAGCATTCCTATGGGAAAG
 2170 2180 2190 2200 2210 2220
 GTGATACCACTCTGATATGCAAAGCATATGATAATTTATCATTCTAACTTCAACGTATA
 2230 2240 2250 2260 2270 2280
 ATAGGGATTGTGACCTGATATTTGGAGATGTAAATATTGCTCAGCATATTAATCCCGATG
 2290 2300
 GAATATAGCATTGTAGTTGACTTTTT

Figur 3



Figur 4



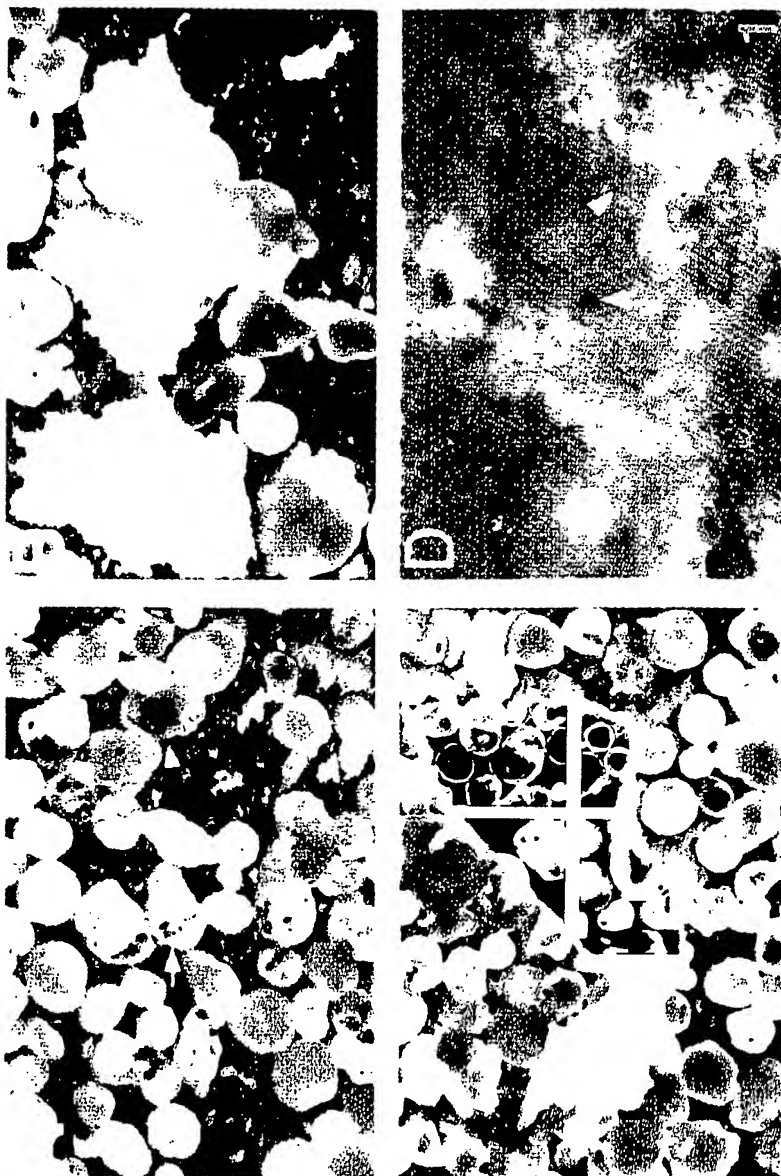


Figure 5

[illegible]

ES 1-13 ES +/+ tail -/- tail +/- tail

15 kb

9 kb

4.7 kb

Alignment of Vest1/mpu1:

Vest1	168	KVYRHHACGQAAFTVYTHLAKRLSSSEKPECTACNRRRRCQNTVNRSSQITTPVNSIQKESRRRLSCNRRNRSTRBRCQ	264
	-	-----	-
mpu1	375	RLRHHACGQAAFTVYTHLAKRLSSSEKPECTACNRRRRCQNTVNRSSQITTPVNSIQKESRRRLSCNRRNRSTRBRCQ	372
	-	-----	-
Vest1	265	NCPLATPRLSPVRRRRCQNTVNRSSQITTPVNSIQKESRRRLSCNRRNRSTRBRCQ	360
	-	-----	-
mpu1	373	KCPALPTRLSPVRRRRCQNTVNRSSQITTPVNSIQKESRRRLSCNRRNRSTRBRCQ	469

Figure 7

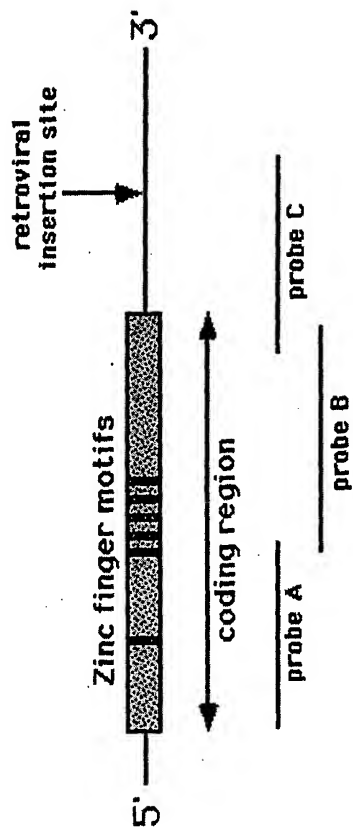


Figure 8



E7.25



E7.5



E8.5



E9.5



E10.5



E11.5

Figure 9

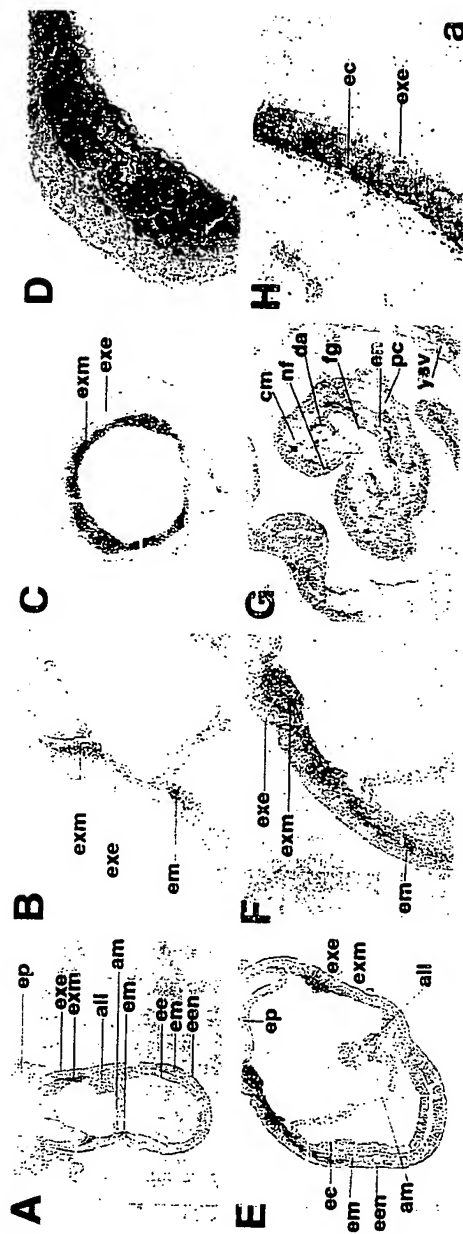
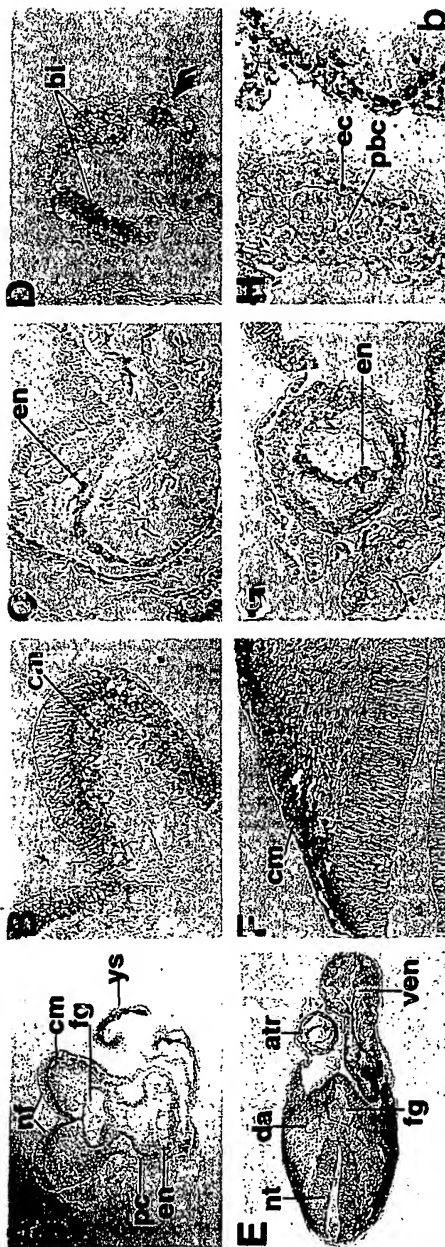


Figure 10

Figure 11



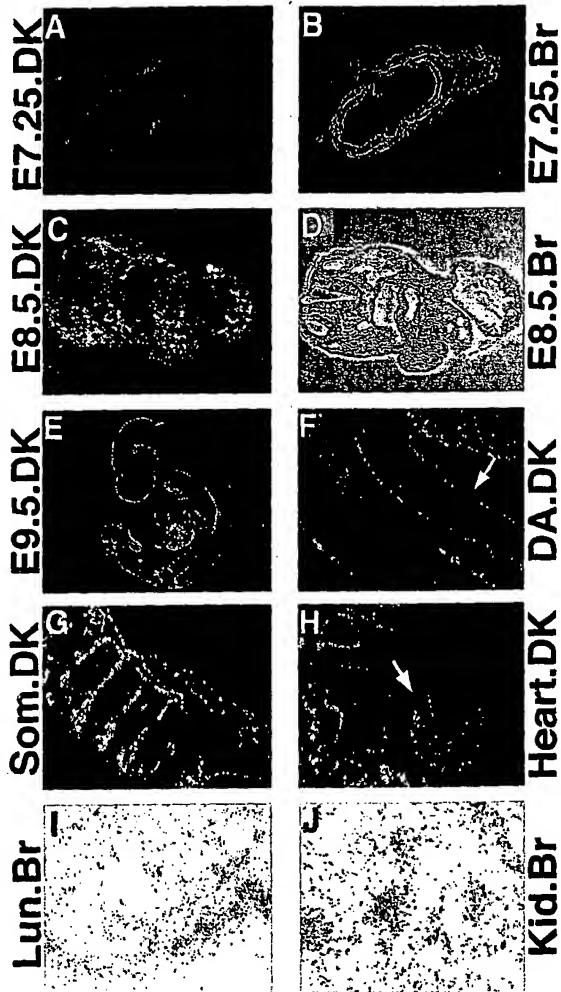
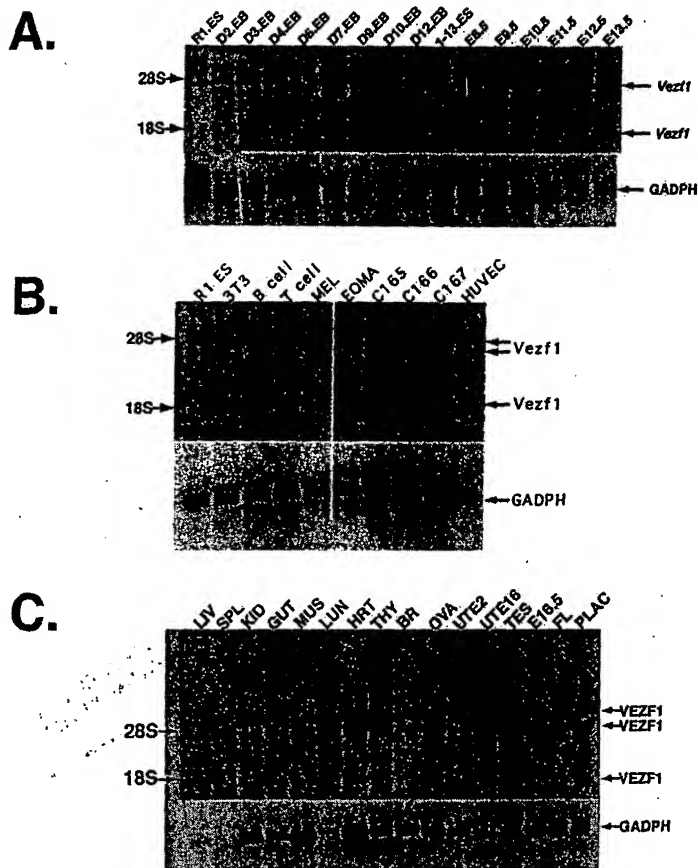
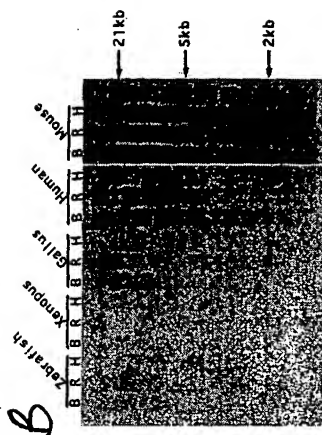


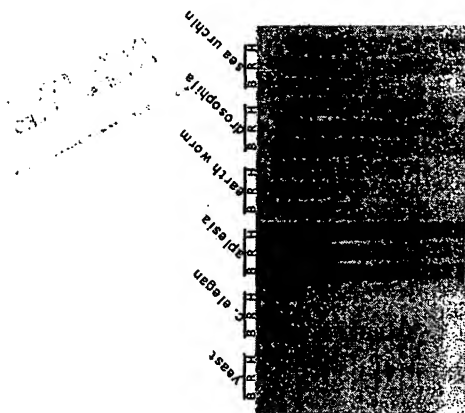
Figure 12

Figure 13





B

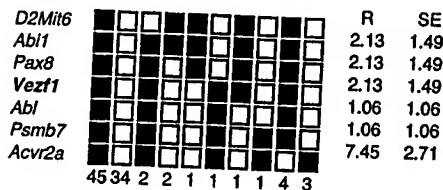


A

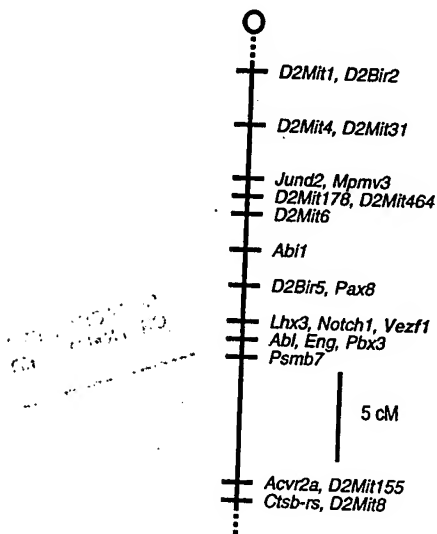
Figure 14

Figur 15

A: Jackson BSS Chromosome 2

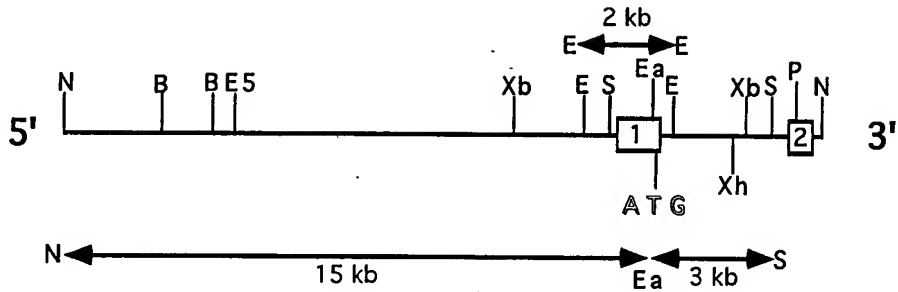


B: Jackson BSS Chromosome 2



Figur 16

Restriction Enzyme Map of a 20 kb Genomic DNA of the Vezf1 Gene



BamHI (B), EcoRI (E), EcoRV (E5), EagI (Ea), NotI (N), PstI (P), SacI (S), XbaI (Xb), and XhoI (Xh).

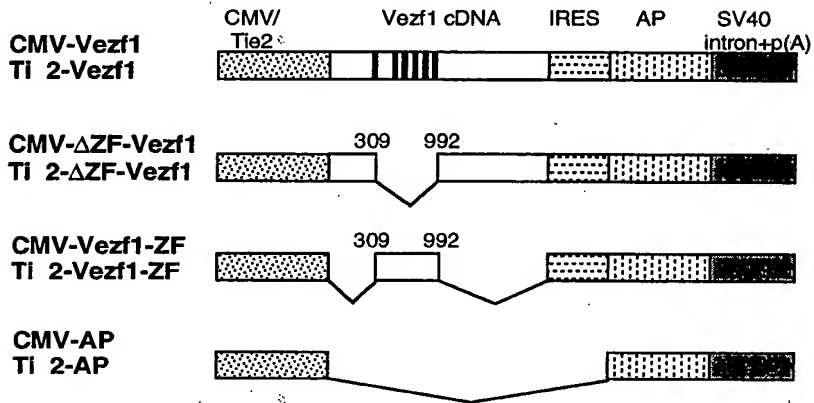
— Intronic sequence;

1 Exon 1

2 Exon 2

Figure 17

Vezf1 EXPRESSION VECTORS



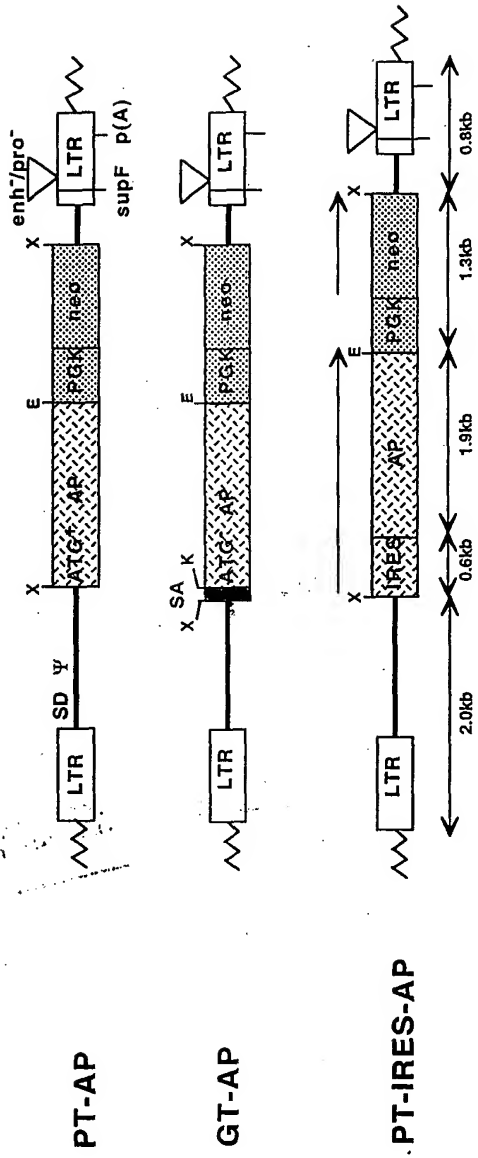


Figure 18